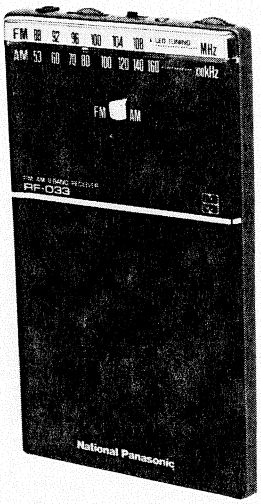
ORDER NO. RD-7811-1636C

Service Manual

Radio

FM/AM 2-BAND PORTABLE RADIO

RF-033



SPECIFICATIONS

Frequency Range:	FM 88 ~ 108 MHz AM 525 ~ 1605 kHz (571 ~ 187 m)
Intermediate Frequency:	FM 10.7 MHz AM 455 kHz
	FM 1 μV (S/N 6dB) for 50 mW Output AM 100 μV/m for 50 mW Output
Power Output:	200 mW DC Maximum
Batteries:	4.5 V (Three "AAA" Size Penlight Batteries) (National UM-4 or equivalent)
Speaker:	4 cm (1-1/2") PM Dynamic Speaker
Dimensions:	72(Wide) × 127(High) × 12 (Deep) mm (2-27/32" × 5" × 15/32")
Weight:	132 g. (4.66 oz.) without batteries
Impedance:	Speaker .....8Ω Earphone Jack 8Ω

Specifications are subject to change without notice for further improvement.

DISASSEMBLY INSTRUCTIONS

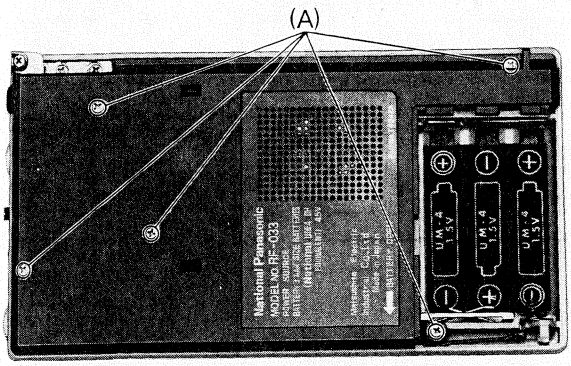


Fig. 1

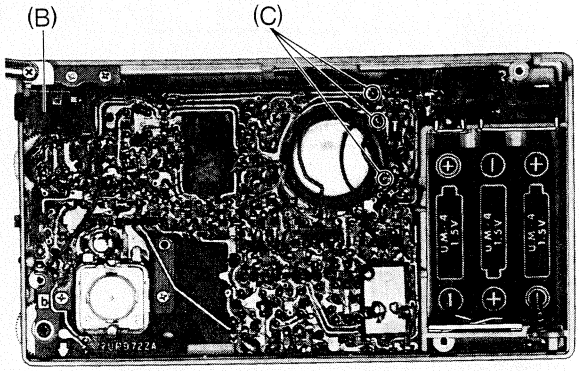


Fig. 2

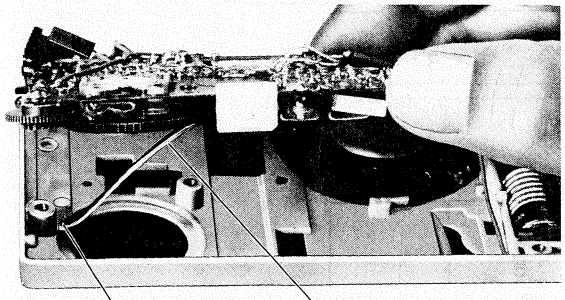


Fig. 3

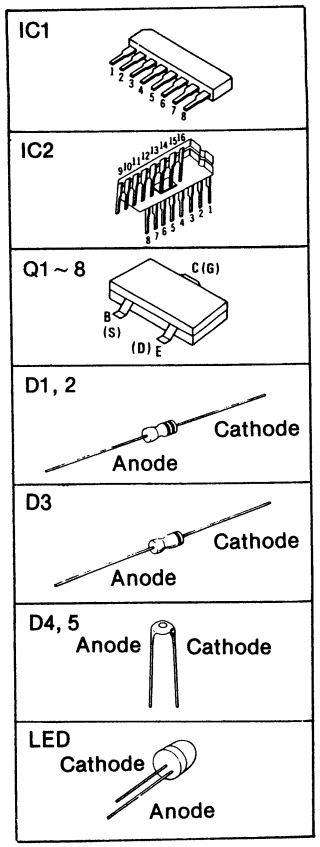
Procedure	To Remove—	Remove—	Shown in fig.—
1	PC Board *	5 Screws ...(A)	1
2		Earphone Jack .....(B)	2
3		Unsolder ...(C)	2

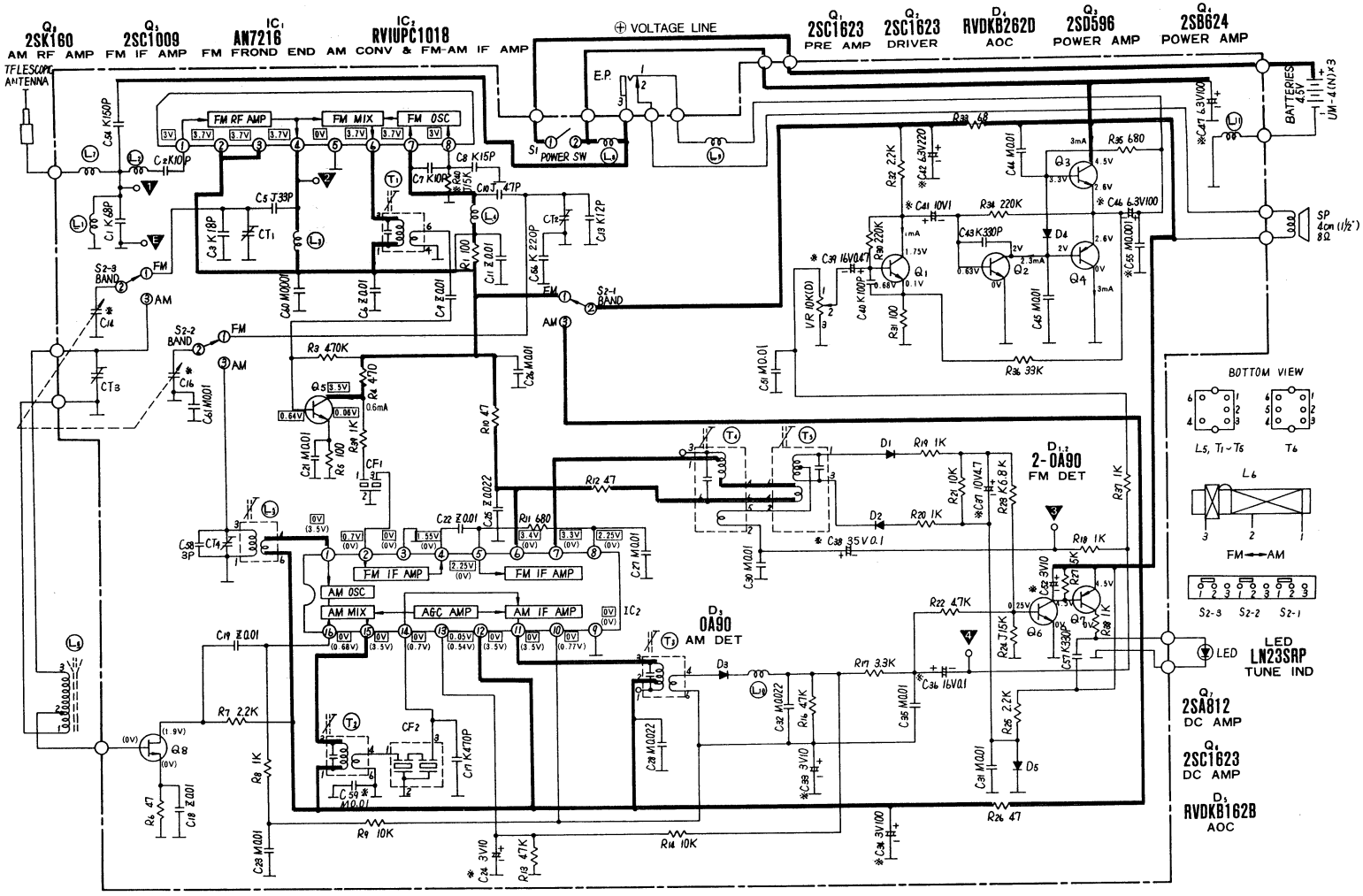
* Insert the pointer in the hole of cabinet, as shown in fig. 3.

National Panasonic

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Schematic Diagram—Model RF-033

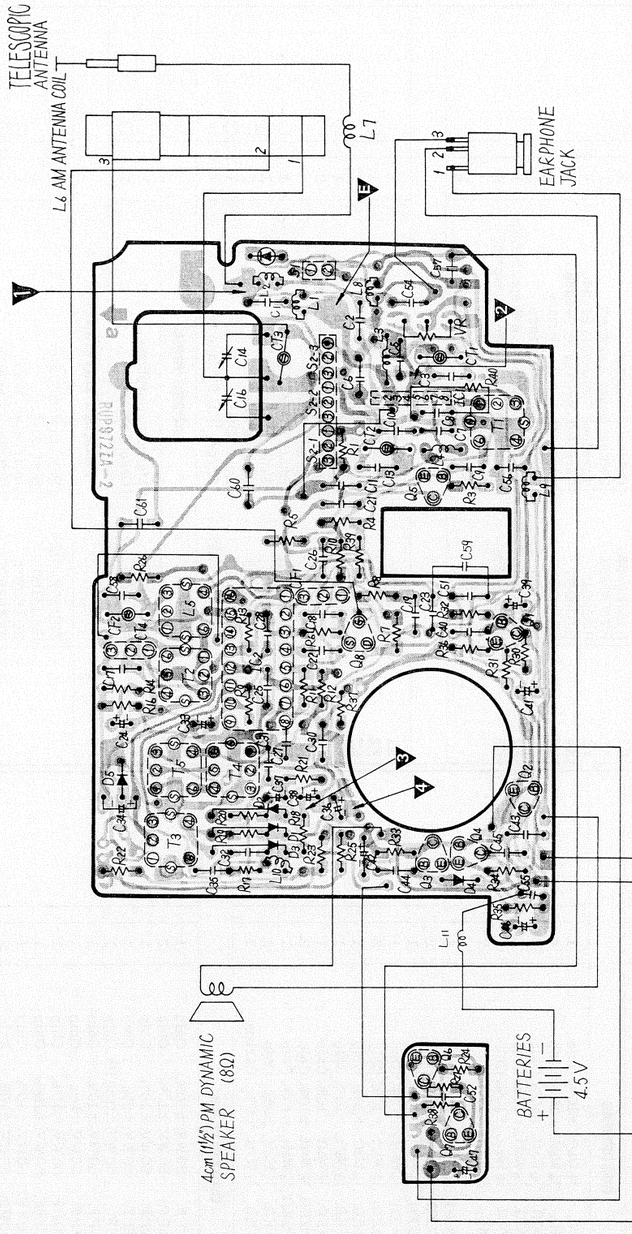




Notes:

1. S_1: Power switch in "OFF" position.
2. $S_{2-1} \sim S_{2-3}$: Band switch in "FM" position.
3. For resistors and capacitors, using chips except ※ mark.
4. DC voltage measurements are taken with circuit tester 10kΩ /V from negative side battery.
   □ .....FM position. ( ).....AM position.
5. Battery current No signal 19mA
   Maximum output 14mA

Circuit Board Wiring View—Model RF-033



IC2

	FM	AM		FM	AM
1	0V	3.5V	9	0V	0V
2	0.7V	0V	10	0V	0.77V
3	0V	0V	11	0V	3.5V
4	1.55V	0V	12	0V	3.5V
5	2.25V	0V	13	0.05V	0.54V
6	3.4V	0V	14	0V	0.7V
7	3.3V	0V	15	0V	3.5V
8	2.25V	0V	16	0V	0.68V

IC1

	FM		FM
1	3V	5	0V
2	3.7V	6	3.7V
3	3.7V	7	3.7V
4	3.7V	8	3V

Q8

	AM
V_S	0V
V_G	0V
V_D	1.9V

Q7

V_E	4.5V
V_B	4.5V
V_C	0V

Q6

V_E	0V
V_B	0.25V
V_C	4.5V

Q5

	FM
V_E	0.06V
V_B	0.64V
V_C	3.5V
I_C	0.6mA

Q4

V_E	2.6V
V_B	2V
V_C	0V
I_C	3mA

Q3

V_E	2.6V
V_B	3.3V
V_C	4.5V
I_C	3mA

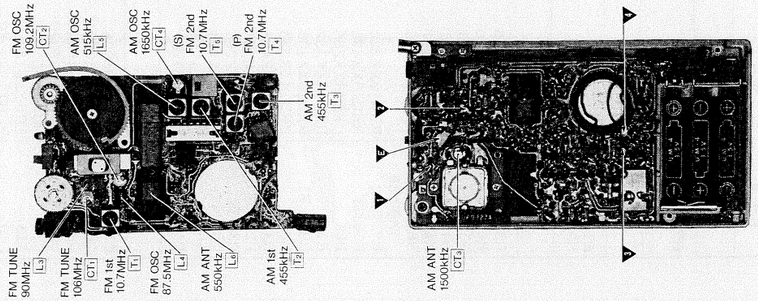
Q2

V_E	0V
V_B	0.63V
V_C	2V
I_C	2.3mA

Q1

V_E	0.1V
V_B	0.68V
V_C	1.75V
I_C	1mA

■ ALIGNMENT POINTS


FM OSC 109.2MHz CT2
AM OSC 515kHz L5
AM OSC 1650kHz CT4
(S) FM 2nd 10.7MHz T5
(P) FM 2nd 10.7MHz T4
AM 2nd 455kHz T3
FM TUNE 90MHz L3
FM TUNE 106MHz CT1
FM 1st 10.7MHz T1
FM OSC 87.5MHz L4
AM ANT 550kHz L6
AM 1st 455kHz T2
AM ANT 1500kHz CT3

ADJUSTMENTS

READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Notes:
1. Set volume control to maximum.
2. Set band selector switch to AM or FM.
3. Set power source voltage to 4.5 volts DC.
4. Signal generator output should be set no higher than necessary to obtain an output reading, to prevent overlooking.

	SIGNAL GENERATOR		RADIO DIAL SETTING	INDICATOR (VTVM or SCOPE)	ADJUSTMENT	REMARKS
	CONNECTIONS	FREQUENCY				
	AM-IF ALIGNMENT					
(1)	Fashion loop of several turns of wire and radiate signal into loop of receiver.	455kHz 30% Mod. with 400Hz.	Point of non-interference. (on/about 600kHz)	Output meter across voice coil.	T_2 (1 st IFT) T_3 (2nd IFT)	Adjust for maximum output.
	AM-RF ALIGNMENT					
(2)	〃	515kHz	Tuning capacitor fully closed.	〃	L_5 (OSC Coil)	〃
	〃	550kHz	Tune to signal.	〃	(*1) L_6 (AND Coil)	Adjust for maximum output. Adjust L_6 by moving coil bobbin along ferrite core.
(4)	〃	1500kHz	Tune to signal.	〃	CT_3 (ANT Trimmer)	Adjust for maximum output.
(5)	〃	1650kHz	Tuning capacitor fully open	〃	CT_4 (OSC Trimmer)	Adjust for maximum output. Repeat steps (2) ~ (5).
	(*1) Cement antenna bobbin in place with wax after completing alignment.					
	FM-IF ALIGNMENT					
(6)	High side thru. 0.001 F to point 2, Negative side to point E.	10.7MHz (400kHz SWP.)	Point of non-interference. (on/about 90MHz).	Connect vert. amp. of scope to point 3, Negative side to point E.	T_1 (FM 1 st IFT) T_4 (FM 2nd IFT) (Primary)	Adjust for maximum amplitude. (Refer to fig. 4).
(7)	〃	〃	〃	〃	T_5 (FM 2nd IFT) (Secondary)	Adjust for maximum amplitude. (Refer to fig. 5.)
	FM-RF ALIGNMENT					
(8)	Connect point 1 through FM dummy antenna Negative side to point E. (Refer to fig. 6.)	87.5MHz	Tuning capacitor fully closed.	Output meter across voice coil.	L_4 (OSC Coil)	(*2) Adjust for maximum output.
(9)	〃	90MHz	Tune to signal.	〃	L_3 (Tuning Coil)	〃
(10)	〃	106MHz	Tune to signal.	〃	CT_1 (Tuning Trimmer)	〃
(11)	〃	109.2MHz	Tuning capacitor fully open.	〃	CT_2 (OSC Trimmer)	(*2) Adjust for maximum output. Repeat steps (8) ~ (11).
	(*2) Three output responses will be present; proper tuning is the center frequency.					

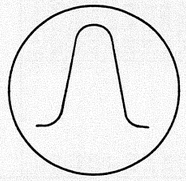


Fig. 4

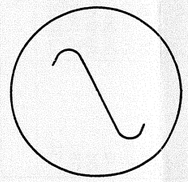


Fig. 5

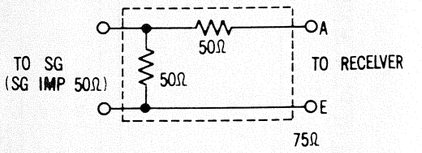


Fig. 6 FM Dummy Antenna

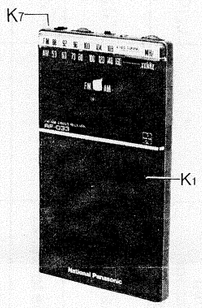
■REPLACEMENT PARTS LIST ····· Model RF-033

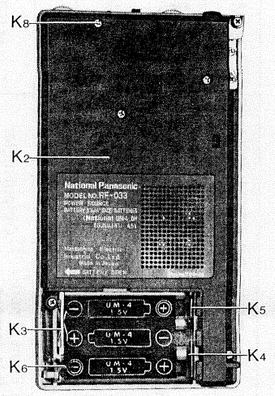
(RD7811-1636C)

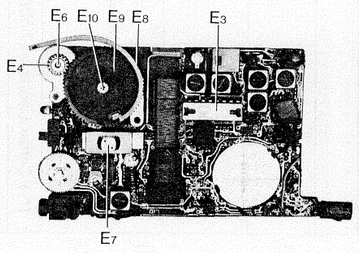
NOTES: 1. Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
2. The ◯ mark is used by the manufacturing plant only.
3. The Ⓢ mark is service standard parts and may differ from production parts.

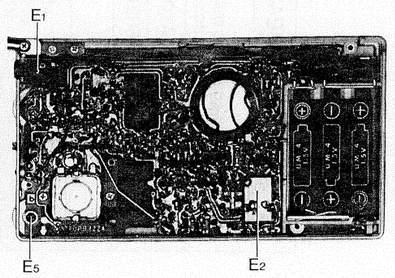
Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
INTEGRATED CIRCUITS, TRANSISTORS AND DIODES					
IC1	AN7216	IC, FM Frond End	1		
IC2	RVIUPC1018	IC, AM Converter, FM AM IF Amp.	1		
Q1,2,6	2SC1623	Transistor (Si), AF Amp., DC Amp.	3		
Q3	2SD596	Transistor (Si), Power Amp.	1		
Q4	2SB624	Transistor (Ge), Power Amp.	1		
Q5	2SC1009	Transistor (Si), FM IF Amp.	1		
Q7	2SA812	Transistor (Ge), DC Amp.	1		
Q8	2SK160	Transistor (Si), AM RF Amp.	1		
D1,2	2-OA90	Diode (Ge), FM Detector	1 pair		Ⓢ
D3	OA90	Diode (Ge), AM Detector	1		Ⓢ
D4	RVDKB262D	Diode (Si), Operation Compensator	1		
D5	RVDKB162B	Diode (Si), Operation Compensator	1		Ⓢ
LED	LN23SRP	LED (Ge), Tuning Indicator	1		
CERAMIC FILTERS, COILS AND TRANSFORMERS					
CF1	RVFCF10S12FR	Ceramic Filter	1		
CF2	RVFCFM2455B	Ceramic Filter	1		
L3	RLO4N106	Tuning Coil, FM	1		◯
L4	RLO4Y16	Oscillator Coil, FM	1		◯
L5	RLO2A1	Oscillator Coil, AM	1		◯
L6	RLF2Y3	Antenna Coil, AM	1		◯
T1	RLI4A1	IFT, FM	1		
T2	RLI2A6	IFT, AM	1		
T3	RLI2A5	IFT, AM	1		
T4	RLI4A7	IFT, FM	1		
T5	RLI4A3	IFT, FM	1		
VARIABLE RESISTORS					
VR29	EVLA3AA00D14	Variable Resistor, 10KΩ (D), Volume	1		
VARIABLE CAPACITORS					
VC14,16	RCVNPCL216G	Tuning Capacitor	1		
CT4,12	ECV1ZW20X53N	Trimmer Capacitor	2		
CT15	ECV1ZW10X64	Trimmer Capacitor	1		
CT20	ECV1ZW10X53N	Trimmer Capacitor	1		

CABINET & CHASSIS PARTS LOCATIONS









Ref. No.	Part No.	Part Name & Description	Per Set		Remarks
SPEAKER					
SP	EAS4P102S	Speaker, Imp. 8Ω, 4cm (1½") PM Dynamic	1		
SWITCHES					
S1	ESD1481	Switch, Power	1		
S2-1~S2-3	ESD1480	Switch, Band	1		◯
RESISTORS					
R33	RRD18XK680	68Ω, ⅛ Watt, ±10%, Chip	1		
R6,10,12,26	RRD18XK470	47Ω, ⅛ Watt, ±10%, Chip	4		
R1,5,31	RRD18XK101	100Ω, ⅛ Watt, ±10%, Chip	3		
R11,35	RRD18XK681	680Ω, ⅛ Watt, ±10%, Chip	2		
R4	RRD18XK471	470Ω, ⅛ Watt, ±10%, Chip	1		
R8,18,19,20, 37,38,39	RRD18XK102	1KΩ, ⅛ Watt, ±10%, Chip	7		
R7,25,32	RRD18XK222	2.2KΩ, ⅛ Watt, ±10%, Chip	3		
R16,22	RRD18XK472	4.7KΩ, ⅛ Watt, ±10%, Chip	2		
R23	RRD18XK682	6.8KΩ, ⅛ Watt, ±10%, Chip	1		
R17	RRD18XK332	3.3KΩ, ⅛ Watt, ±10%, Chip	1		
R9,14,21	RRD18XK103	10KΩ, ⅛ Watt, ±10%, Chip	3		
R36	RRD18XK333	33KΩ, ⅛ Watt, ±10%, Chip	1		
R13	RRD18XK473	47KΩ, ⅛ Watt, ±10%, Chip	1		
R27	RRD18XK153	15KΩ, ⅛ Watt, ±10%, Chip	1		
R30,34	RRD18XK224	220KΩ, ⅛ Watt, ±10%, Chip	2		
R3	RRD18XK474	470KΩ, ⅛ Watt, ±10%, Chip	1		
R24	RRD18XJ153	15KΩ, ⅛ Watt, ±5%, Chip	1		
R40	ERD10TJ153	15KΩ, ⅛ Watt, ±5%, Carbon	1		
CAPACITORS					
C1	ECUX1H680KC	68PF, 50WV, ±10%, Chip	1		
C2,7	ECUX1H100KC	10PF, 50WV, ±10%, Chip	2		
C8	ECUX1H150KC	15PF, 50WV, ±10%, Chip	1		
C5	ECUX1H330JC	33PF, 50WV, ±5%, Chip	1		
C58	ECUX1H030CC	3PF, 50WV, ±0.25PF, Chip	1		
C13	ECUX1H120KC	12PF, 50WV, ±10%, Chip	1		
C10	ECUX1H470JC	47PF, 50WV, ±5%, Chip	1		
C40	ECUX1H101KD	100PF, 50WV, ±10%, Chip	1		
C56	ECUX1H221KD	220PF, 50WV, ±10%, Chip	1		
C17	ECUX1H471KD	470PF, 50WV, ±10%, Chip	1		
C43,57	ECUX1H331KD	330PF, 50WV, ±10%, Chip	2		
C60	ECUX1H102MD	0.001μF, 50WV, ±20%, Chip	1		
C6,9,11,18, 19,22	ECUX1H103ZF	0.01μF, 50WV, +80% −20%, Chip	6		
C21,23,26,27, 30,31,35,44, 45,51,61	ECUX1H103MD	0.01μF, 50WV, ±20%, Chip	11		
C25	ECUX1H223ZF	0.022μF, 50WV, +80% −20%, Chip	1		
C3	ECUX1H180KC	18PF, 50WV, ±10%, Chip	1		
C54	ECUX1H151KD	150PF, 50WV, ±10%, Chip	1		
C59	ECFVD103MD	0.01μF, 25WV, ±20%, Semi-Conductor	1		
C36,38	ECSF35ER1SM	0.1μF, 35WV, Electrolytic	2		
C39,41	ECSF16ER47SM	0.47μF, 16WV, Electrolytic	2		
C24,33,52	ECSF3E10SM	10μF, 3.15WV, Electrolytic	3		
C37	ECSF0FM475	4.7μF, 3.15WV, Electrolytic	1		
C42	ECSF0JF227	220μF, 6.3WV, Electrolytic	1		
C34	ECSF0FE107S	100μF, 3.15WV, Electrolytic	1		
C46,47	EAEA1AS101	100μF, 10WV, Electrolytic	2		Ⓢ
C55	ECKD1H102MD	0.001μF, 50WV, ±20%, Ceramic	1		
CABINET					
K1	RYMF033X	Cabinet Assembly	1		◯
K2	RYFF033X	Cabinet Cover Assembly	1		◯
K3	RJC901Z	Terminal, Battery ⊕, ⊖ Side	1		
K4	RJC908Z	Terminal, Battery ⊕, ⊖ Side	1		
K5	RJC909Z	Terminal, Battery ⊕ Side	1		
K6	RJC911Z	Spring, Battery ⊖ Side	1		
K7	XEARK101FAY	Telescopic Antenna, 6 Steps, 515mm	1		◯
K8	XSH2+4FN	Screw, Cabinet Cover, Telescopic Antenna M'tg	9		
	RKK146Z0	Cover, Battery Compartment	1		
CHASSIS					
E1	RJJ114Z	Jack, Earphone	1		
E2	RMC534Z	Shield Cover	1		◯
E3	RMC171Y	Shield Cover	1		
E4	RBT108Z1	Knob, Tuning	1		◯
E5	XSN2+W4	Screw, Tuning Knob & Tuning Capacitor M'tg	2		
E6	RDT9100Z	Shaft, Tuning Knob	1		◯
E7	RBD62Z1	Knob, Band Switch	1		◯
E8	RDP763Z1	Pointer, Dial	1		◯
E9	RDD3280Z	Drum, Dial	1		◯
E10	XSHR17+2FZ	Screw, Dial Drum M'tg	1		
ACCESSORIES					
	XEH1A2-C	Magnetic Earphone	1		Ⓢ
	RQD125X	Case, Cabinet	1		◯
PACKING MATERIALS					
	XZB10X20A04	Polyethylene Cover	2		Ⓢ
	RPH316Z	Soft Cover	1		
	RQX6378Z	Instruction Book	1		◯
	RPK9269Z	Gift Box Complete	1		◯
	(Not Available Order RPK9269Z)	Gift Box	(1)		
		Accessory Box	(1)		
		Pad	(1)		
		Pad	(1)		
		Sleeve	(1)		

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